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**RCRA FACILITY INVESTIGATION / PHASE II  
SHALLOW SAMPLING INVESTIGATION OF  
SOLID WASTE MANAGEMENT UNITS #4 AND #7**

**DISPOSAL SYSTEMS, INC.  
DEER PARK, TEXAS**

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## **1.0 INTRODUCTION**

Environmental Permitting & Compliance, Inc. (EP&C) was retained by the GNI Group, Inc. (GNI) to perform a Phase II RCRA Facility Investigation (RFI) of two solid waste management units (SWMU) at the Disposal Systems, Inc. (DSI) facility located in Deer Park, Texas (Figure 1-1). The investigation was performed in accordance with the methods described in the RCRA Facility Work Plan (Work Plan) for DSI as required by the DSI hazardous waste permit number HW-50058-001. EP&C has noted in this report where field conditions resulted in variances from the approved Work Plan.

### **1.1 Scope of the RFI Work Plan**

Pursuant to Provision VIII. of the facility's hazardous waste permit, a Work Plan was prepared to address the investigation of seven solid waste management units. The Work Plan was approved on January 20, 1998 by the Texas Natural Resource Conservation Commission (TNRCC). A copy of the approval letter is included as Appendix A.

Pursuant to Provision VIII.B(2), the Work Plan required a Phase I visual investigation of six SWMUs to evaluate the potential for a release from each of the units. Based upon the results of the Phase I investigation, a Phase II investigation would be performed to collect soil samples from beneath any of the SWMUs identified in the Phase I report as requiring an additional investigation. The Phase II investigation would also address SWMU #7, a sump that was excluded from the scope of the Phase I investigation because it had been filled with concrete. Accordingly, this sump could not be visually inspected.

### **1.2 Phase II RFI Scope of Work**

The results of the Phase I RFI were submitted to the TNRCC in March, 1998. Based upon the inspection of the six SWMUs, SWMU #4 was identified as an area of concern requiring an additional investigation. EP&C conducted the Phase

II RFI on March 18, 1998 that included the collection of background soil samples and soil samples from areas adjacent to SWMU #7 and SWMU #4 in accordance with the approved Work Plan. Figure 1-2 illustrates the sampling locations for these two SWMUs that were approved in the Work Plan.

The following sections describe the soil investigation activities, the laboratory analytical results, and the results of the statistical evaluation of the analytical results.

## **2.0 SITE DESCRIPTION**

### **2.1 Facility Location**

The DSI facility is located at 2525 Battleground Road in Deer Park, Texas. The site is situated in a highly industrialized area located on the south side of the Houston Ship Channel, approximately 1,200 feet north-northwest of the intersection of State Highway 134 and Tidal Road. Figure 1-1 illustrates the location of the facility.

### **2.2 Facility Background**

DSI operates a commercial injection well for the disposal of hazardous wastes generated at off-site facilities. The facility began construction in 1981. The area occupied by DSI was a portion of the DSI Transports, Inc. tank truck transportation facility terminal yard. The terminal yard was used to park empty, bulk transport trailers. The terminal yard was paved with crushed limestone.

DSI excavated soil in stages from several portions of the present site during a period from 1984 to 1986. Figure 2-1 illustrates the excavation areas. Soil samples from the bottoms of the excavations were analyzed for volatile and semi-volatile organic priority pollutants, and RCRA Extraction Procedure Toxicity (EP TOX) constituents. The Texas Water Commission inspected and approved each of the excavations for completeness. Figures 2-2 and 2-3 illustrate the total concentrations for twelve metals remaining in the soils beneath the excavations. These areas were subsequently backfilled with clay and the entire facility is now covered with concrete.

Since excavations were completed in 1986, DSI has had occasional minor spills of hazardous waste only. Each of these spills was remediated promptly, and did not become a release to the environment. DSI is not aware of any releases of hazardous waste or hazardous constituents onto or beneath the facility.

## 2.3 Phase II SWMU Descriptions

### 2.3.1 SWMU #4

SWMU #4, the Storage/Treatment Unit I trench/sump system, was constructed in 1986. This storage tank area was completely excavated in 1985 to a depth of 2 to 10 feet below ground surface. The excavation was conducted because of leaks through the previous base of the storage tank area. The storage tank area is illustrated on Figure 1-2. During the excavation, the perimeter containment walls were left in place and the resulting excavation was somewhat bowl shaped. After TWC concurrence that all soils had been removed that were potentially classifiable as hazardous waste, the excavation was backfilled with engineered and compacted lifts of tight clay. Afterwards, foundation base material (e.g., crushed limestone or sand) was placed on the compacted clay and a new, reinforced, high strength concrete base was poured within the confines of the remaining perimeter containment walls. Six, square-shaped, elevated pads for storage tanks were poured on top of the concrete base, creating a network of perimeter and interior trenches. Figures 2-4 and 2-5 illustrate this construction. In 1991, the trenches and sumps were modified by an overlay of high strength concrete to create the current physical trench/sump configuration as shown on Figure 2-5.

The trenches and sump are operated to collect drips, spills, and rainfall. Accumulated liquids drain to the sump where they are removed in an expeditious manner and disposed of properly. There are no records of any spilled materials penetrating the concrete. Based upon a review of the unit's construction during Phase I of the RFI, this unit was included in the Phase II investigation.

### 2.3.2 SWMU #7

This SWMU is identified in the facility's hazardous waste permit as the "transfer pump station and ancillary underground piping." The "ancillary underground piping" was actually below grade piping located in an open, concrete-lined, containment trench (commonly referred to as a pipe chase) between the transfer pump station and the truck unloading stations. SWMU #7 is illustrated on Figures 1-2 and 2-6.

SWUM #7 was constructed in 1981. The pumps were subsequently removed and, in 1991, all of the SWMU was filled with high strength, reinforced concrete to yield a concrete surface flush with the surrounding area (Figure 2-7). The former location of SWMU #7 is visually distinguishable by the color of the new versus the older, surrounding concrete.

SWMU #7 was operated to collect minor drips, spills, and rainwater. Collected material was removed and managed appropriately. There are no records of any spilled materials penetrating through the concrete.

### **3.0 PHASE II SUBSURFACE INVESTIGATION**

#### **3.1 Soil Sampling Locations**

The RFI Work Plan identified the locations for collecting background samples, as well as locations for collecting samples to investigate the two subject SWMUs. The background locations are identified as soil borings SB-1 through SB-5 on Figure 1-2. As discussed in the RFI Work Plan, the proposed background sampling locations are not in areas that have been directly affected by DSI's operations. Although the area around the site and portions of the site have been subjected to a long history of industrial activity, the proposed locations are not known to have been significantly impacted by offsite or past onsite activities or incidents.

The locations for the soil borings used to investigate the SWMUs are identified as SB-6 and SB-7 on Figure 1-2. Soil boring SB-7A was collocated to soil boring SB-7 to provide adequate sample volume for a duplicate sample. Soil borings SB-7 and SB-7A could not be advanced within the secondary containment area due to limited access and were, therefore, located adjacent and downgradient to the unit in accordance with the proposed sampling location in the RFI Work Plan.

The RFI Work Plan required the collection of soil samples at depths equivalent to the one- to two-foot interval beneath the concrete of the two subject SWMUs. The depth of the sumps subject to investigation is approximately 2 feet below the ground surface. Accordingly, a depth of two to four feet below the ground surface was selected as the sampling interval for purposes of this investigation.

#### **3.2 Sampling Methodology**

EP&C contracted Vironex Environmental Services, Inc. to advance soil borings using a truck-mounted geoprobe. The geoprobe consisted of a four-foot long stainless steel tube having an inside diameter of two inches. A clean, thin-walled,

acetate liner was inserted into the stainless steel tube at each sampling location to collect the soil core. This procedure minimized the potential for cross-contaminating soil cores by not allowing the soil core to come into contact with the coring apparatus.

The truck-mounted hydraulic hammer was used to drill through the surface concrete. The hammer device produced a hole through the concrete having a diameter of approximately five inches. The hammer cracked and pulverized the concrete. The concrete dust that collected around the top of the hole was swept into a bucket used to collect investigation derived waste. After the hammer drilled through the concrete, the hammer attachment was removed and the decontaminated geoprobe was attached. The geoprobe was pushed hydraulically to collect a soil core extending to a depth of four feet beneath the bottom of the concrete.

A clean acetate liner was used at each sampling location to retrieve the four-foot soil core. As the geoprobe was advanced (i.e., hydraulically pushing the stainless steel sampler into the soil), the soil core was retrieved inside of the acetate liner. Since the geoprobe was pushed hydraulically into the ground, there were no drill cuttings to collect and no blow counts to record. Therefore, the 10 x 10 foot plastic sheet specified in the RFI Work Plan was not used at each drilling location.

After the geoprobe was removed from the ground, the liner containing the soil core was removed from the geoprobe. A clean utility knife was used to open the acetate liner to provide access to the soil core. Each soil core was trimmed using a clean knife and was inspected visually. The physical properties (i.e., color and soil classification) were recorded in the field logbook by a registered professional geologist using the Unified Soil Classification System. These descriptions were used to generate the soil boring logs included in Appendix B. Each borehole was

subsequently filled with bentonite pellets and hydrated. The hole in the surface concrete was then patched with concrete.

Sample jars were filled with soil from the two- to four-foot interval in order of volatility. Samples jars for volatile organic analyses were filled as much as possible so that no head space remained in the container after the container was closed with a teflon-lined lid. Sample identification, time of sample collection, analyses requested, size and type of sample container, and the preservative used were recorded in the bound field logbook.

### **3.3 Field QA/QC**

The RFI Work Plan required the collection of one duplicate sample and an equipment blank as part of the quality assurance/quality control (QA/QC) program. A duplicate sample was collected from the location adjacent to SWMU #4. There was an insufficient amount of soil from soil boring SB-7 to prepare a duplicate sample, so soil boring SB-7A was collocated next to SB-7 to provide the duplicate sample volume. The duplicate sample was identified on the sample label and Chain-of-Custody form as sample SB-X. The sample matrices were almost exactly the same with the exception that the soil core from SB-7 contained some gravel where as the soil core from SB-7A did not.

An equipment blank was collected by pouring deionized water over the decontaminated knife used to trim the soil cores. The water was collected in three, 40 ml glass vials that were sealed with teflon-lined lids containing septums. These vials were labeled as EQB-1 and were analyzed for volatile organic compounds (VOCs) using EPA Method 8260 from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), Third Edition, Revised December 1996".

A trip blank consisting of three 40 ml glass vials filled with deionized water by the laboratory was shipped to the site in the ice chest containing the sample jars, and returned to the laboratory with the RFI samples. The trip blank was analyzed for VOCs using EPA Method 8260.

### **3.4 Sample Management and Documentation**

The sample labels on the jars were completed with the name of the sampling location, client name, time and date of sample collection, the initials of the person collecting the samples, and identification of the analyses to be performed. Sample jars were placed in plastic bubble wrap and then into Ziploc™ plastic bags. Samples were then placed into an ice chest to await shipment to the laboratory. Prior to conducting sampling activities, Ziploc™ plastic bags were filled with ice and placed in the ice chest to reduce the temperature of the ice chest. After sampling activities were completed, water was drained from the plastic bags and additional ice was placed in the ice chest to preserve the samples.

Each sample was entered on the Chain-of-Custody form by identifying the sample name and the depth interval of the sample (i.e., SB-1, 2 to 4 ft.), the sample matrix (i.e., soil or liquid), the date and time of sample collection, the number of sample jars, the required analyses, the type of preservative (cool to 4 degrees C), the name of the person collecting the samples, the name of the client and project, a record of the date and time that the custody seal was applied to the shipping cooler, and the date, time, and signature records of the persons relinquishing and accepting custody of the samples.

Sampling activities were completed after 5:00 p.m. on March 18, 1998 and the laboratory did not have anyone present to accept custody of the samples. Therefore, the samples were retained in the custody of the DSI security guards overnight for pick-up by the laboratory courier the next morning.

### **3.5 Analytical Methods**

Provision VIII.C.3.b of the facility's hazardous waste permit specifies that the target analyses for each unit should be based upon a consideration of the complete list of hazardous substances identified in 40 CFR 261, Appendix VIII, which includes a number of compounds for which there are no analytical methods readily available. Therefore, the approved RFI Work Plan specified a list of Appendix VIII compounds (except for dioxins) for which EPA SW-846 protocols exist. Dioxins were not proposed to be included in the list because DSI did not historically accept dioxin wastes. Table 3-1 of the RFI Work Plan listed the chemical classes for which soil samples were analyzed. This table is incorporated in this report as Table 3-1.

### **3.6 Equipment Decontamination**

The stainless steel geoprobe tube was decontaminated using a non-phosphate detergent wash and double rinsed with potable water. Since the tube did not come into contact with the soil core, the tube was not rinsed with deionized water. The truck containing the geoprobe was equipped with a decontamination station consisting of five-gallon buckets on a truck-mounted rack.

The stainless steel knife used to cut the acetate tubes and trim the soil cores was decontaminated in a five-gallon bucket using a non-phosphate detergent and scrub brush to remove accumulated soil. The knife was double rinsed using deionized water and was air dried. Buckets were placed on plastic sheeting that was diked to collect any spillage.

### **3.7 Investigation Derived Waste**

Soil core trimmings and soil not used to fill sample jars were collected in a five-gallon bucket. Soil investigation activities resulted in approximately three gallons

of soil cuttings. This material was taken by DSI personnel and placed into their stabilization process for off-site disposal at an authorized facility. Water from the decontamination activities was collected by DSI personnel and placed in the deep well injection system for disposal in the DSI injection well. Discarded acetate tubes, latex gloves, and other solid debris (paper towels, etc.) were collected in plastic trash bags for classification and proper disposal by DSI.

## 4.0 ANALYTICAL RESULTS

Soil samples were shipped to Environmental Chemistry, Inc. (ECI) in Houston, Texas for analyses of the constituents of concern. ECI subcontracted the analyses for the chlorinated herbicides, chlorinated pesticides, PCBs, and organophosphorus pesticides to Quanterra Laboratories in West Sacramento, California. Quanterra experienced some major malfunctions with their analytical equipment and was unable to analyze the organophosphorus pesticides. Quanterra subcontracted these analyses to North Coast Laboratories Ltd. in Arcata, California.

The following sections discuss the analytical results, the laboratory QA/QC, data validation, and the results of the statistical comparisons.

### 4.1 Analytical Results

The laboratory reports for all soil samples did not indicate the presence of any semi-volatile organic compounds, chlorinated herbicides, chlorinated pesticides, PCBs, total cyanides, or total sulfides. Various metals were detected in low concentrations, as well as three volatile organic compounds and one organophosphorus compound. Table 4-1 summarizes the concentrations of the metals and other constituents detected in the background soil samples and in soil borings SB-6, SB-7, and SB-7A.

Acetone was detected in two background soil borings (SB-4 and SB-5) in concentrations of 206 ug/KG and 248 ug/KG, respectively. Bis(2-ethylhexyl) phthalate was detected in background soil boring SB-5. P-xylene and m-xylene were detected in background soil borings SB-1, SB-2, SB-3, and SB-4 at concentrations of 444 mg/KG, 4140 mg/KG, 12 mg/KG, and 34 mg/KG, respectively.

Acetone was also detected in soil borings SB-6, SB-7, and SB-7A at concentrations of 216 ug/KG, 288 ug/KG, and 346 ug/KG, respectively. P-xylene, m-xylene, and bis(2-ethylhexyl)phthalate were not detected in any of these soil borings. No other volatile organic compounds were detected in these soil borings.

Diazinon, an organophosphorus pesticide, was detected in background soil borings SB-4 and SB-5 in concentrations of 53 mg/KG and 89 mg/KG, respectively. Diazinon was not detected in the soil samples from soil borings SB-6, SB-7, and SB-7A.

#### **4.2 Laboratory QA/QC**

The Work Plan specified the QA/QC procedures for laboratory analyses to ensure quality analytical data that meet the RFI objectives of determining whether releases from the SWMUs have occurred. The QA objectives were to implement specific procedures to obtain measurement data that are of known quality with respect to:

- precision
- accuracy
- completeness
- representativeness
- comparability

These objectives were defined in the Work Plan. The laboratory reports were reviewed to determine whether the data met these objectives. The laboratory QA/QC reports are included with the analytical reports as Appendix C.

## 5.0 STATISTICAL COMPARISONS

Appendix D of the approved RFI Work Plan specified the statistical method to be used to determine whether soil analytical results exceed corresponding background concentrations. The method involved two steps, as follows:

1. Determining the “background comparison concentration” for each analytical parameter, and
2. Comparing the analytical results for each sample against the comparison parameter concentrations determined in Step 1.

The “background comparison concentration” for the cases where all of the background sample values for a parameter are at non-detectable levels was defined as twice the detection limit. Otherwise, the “background comparison concentration” was equal to the upper 95.5 percent, two-tailed confidence limit for the parameter. If a background sample value for a parameter was at a non-detectable level, then a value of one-half the detection limit for that sample was to be used when calculating the mean and standard deviation.

The formulas that were used were as follows:

$X_i$  = A background sample concentration

$X$  = Mean of background samples

$n$  = Number of background samples

$s$  = Sample standard deviation

$$X = \frac{\sum_{i=1}^n X_i}{n}$$

$$s = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (X_i - X)^2}$$

where the  $\alpha$  level for +/- two standard deviations is 4.5% and  $1 - (0.045/2) = 0.98875$ .

The values for  $t_{(n-1, 0.98875)}$  for the three, four, or five background samples are 4.5534, 3.3216, and 2.8803, respectively. Statistical comparisons were not performed for constituents of concern that were not detected in the background samples and in the samples from soil borings SB-6 and SB-7. Table 5-1 provides the background 95.5% confidence limit calculations. Table 5-2 provides the results of the statistical comparisons for constituents of concern that were detected. As illustrated on Table 5-2, the concentrations of total arsenic, total cobalt, total copper, total nickel, and total vanadium exceeded the statistical background concentration. The amounts by which the detected concentrations exceeded background varies from 0.08 to 2.2 mg/KG.

As discussed in Section 1.0 of this report, DSI excavated and removed soil from several portions of the facility during a period from 1984 to 1986. Soil samples collected from beneath the excavations were analyzed. The completeness of each excavation was confirmed by analyses and inspected and approved by the Texas Water Commission (TWC). Figures 2-2 and 2-3 illustrates the total concentrations for nine metals remaining in the soils beneath the excavations. Table 5-3 provides a summary of the variations in concentrations for the metals that the TWC allowed to remain in place, the range of concentrations of metals of concern, and the "background comparison concentrations".

The concentration of total nickel (6.5 mg/KG) in the soil sample from SB-6 and the concentrations of total arsenic (7.94 mg/KG) and total copper (7.47 mg/KG) detected in the soil sample from SB-7 fall within the ranges listed above. It is noted that the RFI background concentration of total nickel (4.3 mg/KG) is less than the residual concentrations reported in 1984-1986. The analyses performed on soil samples collected after the excavations performed between 1984 and 1986 do not include total cobalt or total vanadium. Based upon a review of the concentrations listed above, it appears that the concentrations of total cobalt and total vanadium detected in the soil sample from SB-7 are probably representative of overall background conditions at the site.

Duplicate soil sample SB-7A was collected as a QA/QC sample for purposes of this investigation and, therefore, was not included in the statistical comparison. Except for total cobalt, the results for all of the parameters analyzed for sample SB-7A are all comparable to the results for sample SB-7. The variance in total cobalt may be attributable to the fact that the duplicate sample was obtained from a collocated soil boring rather than from a single soil boring replicate. The collocated boring was necessary in order to obtain adequate sample volume for the required analyses.

## 6.0 SUMMARY AND RECOMMENDATIONS

EP&C conducted an investigation of two SWMUs (SWMU #4 and SWMU #7) at the DSI facility located in Deer Park, Texas. The investigation consisted of advancing eight soil borings to a depth of four feet beneath the surface concrete. Five of the soil borings were placed to represent background conditions. The two SWMUs are located adjacent to each other. Two soil borings and one duplicate soil boring were advanced at locations downgradient of the two SWMUs. Soil samples were collected for analyses from the two- to four-foot interval to represent soil conditions beneath the SWMUs. Soil samples were analyzed for volatile organic compounds, semi-volatile organic compounds, total metals, chlorinated herbicides, chlorinated pesticides, PCBs, organophosphorus pesticides, total cyanides, and total sulfides.

Statistical comparisons were performed for the detected constituents to determine whether the concentrations statistically exceeded the "background comparison concentration". Acetone was detected in two background samples and in the soil samples from SB-6 and SB-7. This was the only volatile organic compound detected. The concentrations of acetone in the soil samples from SB-6 and SB-7 did not statistically exceed the "background comparison concentration". Acetone is a common chemical used by laboratories. DSI manages a wide range of wastes containing VOCs and has not managed pure acetone that would be the source of the acetone detected in the samples. Since this was the only VOC detected, it is reasonable to assume that it was not the result of a release to the soil, but an artifact introduced through analyses.

Diazinon was detected only in two background soil samples. The background sampling locations were located near the edge of the facility boundary where fire ants were observed during field activities. Diazinon has been used to control the fire ant population and is assumed to be the source of this constituent. Diazinon was not detected in soil samples from SB-6 and SB-7 and, therefore, did not statistically exceed the "background comparison concentration".

Although the statistical comparisons for total arsenic and total copper in the sample from SB-7 and total nickel in the sample from SB-6 statistically exceeded the "background comparison concentrations" determined for this investigation, the concentrations of these metals fall within the range of concentrations listed on Table 5-3 that were allowed to remain in place by the TWC during prior excavations at the facility.

In the evaluation of "background comparison concentrations" for a facility such as DSI that has a prior history of industrial use, it may not be reasonable to rely solely upon the information derived from statistics for background levels of metals. The purpose of the statistics is to establish whether the current industrial activities at a unit have had an impact on the surrounding environmental media. The areas being investigated by this RFI are located within zones that were demonstrated in the 1984-1986 timeframe to contain metals at TWC approved concentrations in excess of the RFI "background comparison concentrations". In this regard, it is important to note that the concentrations of total arsenic, total copper, and total nickel reported to be present in soil samples from soil borings SB-6 and SB-7 are less than the concentrations reported to be present following the 1984-1986 site remedial activities (see Table 5-3). Soil samples collected during the 1984-1986 timeframe were not analyzed for total cobalt and total vanadium. The exceedances above "background comparison concentrations" of the reported concentrations for total cobalt and total vanadium are within the same range (percent of concentration) as the exceedances noted for total arsenic, total copper, and total nickel. Based upon this information, DSI has determined that there have not been any releases from SWMU #4 or SWMU #7. Therefore, DSI does not propose to conduct any further investigations of these units.

## TABLES

**TABLE 3-1**  
**SAMPLING ANALYTICAL PARAMETERS AND METHODS**  
**Disposal Systems, Inc.**  
**Deer Park, Texas**

Analytical Parameter	Methodology (U.S. EPA Methods)	
	Soil <sup>1</sup>	Water <sup>2</sup>
Volatiles	8260	624
Semi-Volatiles	8270	625
Chlorinated Herbicides	8150	509B
Chlorinated Pesticides/PCBs	8080	608
Organophosphorus Pesticides	8140	614
Total Metals	6000/7000	200 series/200.7
Total Cyanides	9010	335.3
Total Sulfides	9030	376.2

<sup>1</sup>Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), Third Edition, Revised December 1996, USEPA.

<sup>2</sup>Methods for Chemical Analysis of Water and Waste (600/4-79-020), USEPA.

**TABLE 4-1**  
**SUMMARY OF ANALYTICAL RESULTS**  
 Disposal Systems, Inc.  
 Deer Park, Texas

Sample ID	Sample Depth Interval	Acetone (ug/KG)	Total Arsenic (mg/KG)	Total Barium (mg/KG)	Total Beryllium (mg/KG)	Total Cadmium (mg/KG)	Total Chromium (mg/KG)	Total Cobalt (mg/KG)	Total Copper (mg/KG)	Total Lead (mg/KG)	Total Nickel (mg/KG)	Total Vanadium (mg/KG)	Total Zinc (mg/KG)	p-xylene & m-xylene (mg/KG)	bis-(2-Ethylhexyl) phthalate (mg/KG)	Diazinon (mg/KG)
SB-1	2.0' - 4.0'	BDL (200)	7.98	310	1.05	1.42	7.88	3.05	6.87	16.4	3.3	26.7	19.4	444	BDL (330)	BDL (50)
SB-2	2.0' - 4.0'	BDL (1000)	6.19	145	1.01	1.16	7.15	2.62	6.49	11.3	1.7	23.9	18.9	4140	BDL (330)	BDL (50)
SB-3	2.0' - 4.0'	BDL (200)	3.73	141	0.87	0.55	4.09	4.29	7.29	10.9	2.5	22.8	14.9	12	BDL (330)	BDL (50)
SB-4	2.0' - 4.0'	206	5.05	168	0.93	0.77	5.33	5.28	6.65	9.91	4.5	18.2	17.6	34	BDL (330)	53
SB-5	2.0' - 4.0'	248	3.70	171	0.90	0.69	5.96	4.06	6.26	19.4	3.0	21.8	17.5	BDL (10)	1430	89
SB-6	2.0' - 4.0'	216	3.19	59.6	0.83	BDL (0.5)	4.25	2.41	4.89	6.01	6.5	17.6	10.7	BDL (10)	BDL (330)	BDL (50)
SB-7	2.0' - 4.0'	288	7.94	151	0.93	1.26	7.74	5.28	7.47	14.2	2.1	27.2	18.1	BDL (10)	BDL (330)	BDL (50)
SB-7A (SB-X)	2.0' - 4.0'	346	5.89	156	1.04	0.95	8.71	11.0	7.56	10.4	4.6	28.9	19.8	BDL (10)	BDL (330)	BDL (50)

BDL - Below Detection Limit

**TABLE 5-1**  
**BACKGROUND 95.5% CONFIDENCE LIMIT CALCULATION**  
 Disposal Systems, Inc.  
 Deer Park, Texas

Sample ID	Sample Depth Interval	Acetone (ug/KG)	Total Arsenic (mg/KG)	Total Barium (mg/KG)	Total Beryllium (mg/KG)	Total Cadmium (mg/KG)	Total Chromium (mg/KG)	Total Cobalt (mg/KG)	Total Copper (mg/KG)	Total Lead (mg/KG)	Total Nickel (mg/KG)	Total Vanadium (mg/KG)	Total Zinc (mg/KG)	p-xylene & m-xylene (mg/KG)	bis-(2-Ethylhexyl) phthalate (mg/KG)	Diazinon (mg/KG)
SB-1	2.0' - 4.0'	100	7.98	310	1.05	1.42	7.88	3.05	6.87	16.4	3.3	26.7	19.4	444	165	25
SB-2	2.0' - 4.0'	500	6.19	145	1.01	1.16	7.15	2.62	6.49	11.3	1.7	23.9	18.9	4140	165	25
SB-3	2.0' - 4.0'	100	3.73	141	0.87	0.55	4.09	4.29	7.29	10.9	2.5	22.8	14.9	12	165	25
SB-4	2.0' - 4.0'	206	5.05	168	0.93	0.77	5.33	5.28	6.65	9.91	4.5	18.2	17.6	34	165	53
SB-5	2.0' - 4.0'	248	3.70	171	0.90	0.69	5.96	4.06	6.26	19.4	3.0	21.8	17.5	5	1430	89

Note: Bold values indicate 1/2 of the detection limit.

# of Values

Mean

Standard Deviation

Coefficient of Variance

95.5% Upper Confidence Limit of Sample Data =  $\bar{x} + t_s / [\text{sqrt}(n)]$

where:

Mean ( $\bar{x}$ )	=	231	5.33	187.00	0.95	0.92	6.08	3.86	6.71	13.58	3.00	22.68	17.66	927.00	418.00	43.40
"t"	=	2.8803	2.8803	2.8803	2.8803	2.8803	2.8803	2.8803	2.8803	2.8803	2.8803	2.8803	2.8803	2.8803	2.8803	2.8803
STD DEV	=	164.010	1.81	70.05	0.08	0.36	1.49	1.05	0.39	4.11	1.03	3.10	1.75	1,805.65	565.73	28.23
95.5% Confidence Limit	=	442.1	7.7	277.2	1.0	1.4	8.0	5.2	7.2	18.9	4.3	26.7	19.9	3252.9	1146.7	79.8

**TABLE 5-2**  
**SUMMARY OF RFI SWMU ANALYTICAL RESULTS AND**  
**STATISTICAL COMPARISONS**  
 Disposal Systems, Inc.  
 Deer Park, Texas

Sample ID	Sample Depth Interval	Acetone (ug/KG)	Total Arsenic (mg/KG)	Total Barium (mg/KG)	Total Beryllium (mg/KG)	Total Cadmium (mg/KG)	Total Chromium (mg/KG)	Total Cobalt (mg/KG)	Total Copper (mg/KG)	Total Lead (mg/KG)	Total Nickel (mg/KG)	Total Vanadium (mg/KG)	Total Zinc (mg/KG)	p-xylene & m-xylene (mg/KG)	bis-(2-Ethylhexyl) phthalate (mg/KG)	Diazinon (mg/KG)
SB-6	2.0' - 4.0'	216	3.19	59.6	0.83	BDL (0.5)	4.25	2.41	4.89	6.01	6.5	17.6	10.7	BDL (10)	BDL (330)	BDL (50)
SB-7	2.0' - 4.0'	288	7.94	151	0.93	1.26	7.74	5.28	7.47	14.2	2.1	27.2	18.1	BDL (10)	BDL (330)	BDL (50)
95.5% Upper Confidence Limit		442.1	7.7	277.2	1.0	1.4	8.0	5.2	7.2	18.9	4.3	26.7	19.9	3252.9	1146.7	79.8

BDL - Below Detection Limit

Note: Bold values exceed the 95.5% Upper Confidence Limit.

**TABLE 5-3**  
**COMPARISON OF TOTAL METALS CONCENTRATIONS**  
**(mg/KG)**

Disposal Systems, Inc.  
Deer Park, Texas

Total Metal	TWC Range*	RFI Background Concentration Range**	RFI Background Comparison Concentration	SWMU #4 (SB-6)	SWMU #7 (SB-7)
Antimony	<1.0 - 40.5	BDL	3.0***	BDL (1.5)	BDL (1.5)
Arsenic	1.7 - 15.2	3.70 - 7.98	7.7	3.19	7.94
Barium	<1.0 - 268	141 - 310	277.2	59.6	151
Beryllium	NA	0.87 - 1.05	1.0	0.83	0.93
Cadmium	<0.1 - 2.5	0.55 - 1.42	1.4	BDL (0.5)	1.26
Chromium	0.3 - 11.7	4.09 - 7.88	8.0	4.25	7.74
Cobalt	NA	2.62 - 4.06	5.2	2.41	5.28
Copper	4.7 - 61.6	6.26 - 7.29	7.2	4.89	7.47
Lead	10.3 - 70	9.91 - 19.4	18.9	6.01	14.2
Mercury	<0.01 - 0.056	BDL	0.20**	BDL (0.10)	BDL (0.10)
Nickel	5.5 - 29	1.7 - 4.5	4.3	6.5	2.1
Silver	<0.1 - 4	BDL	1.0***	BDL (0.50)	BDL (0.50)
Thallium	<1.0 - 24.7	BDL	20***	BDL (10.0)	BDL (10.0)
Vanadium	NA	18.2 - 26.7	26.7	17.6	27.2
Zinc	36 - 458	14.9 - 19.4	19.9	10.7	18.50

\*Range of concentrations approved by the TWC after 1984 to 1986 excavations.

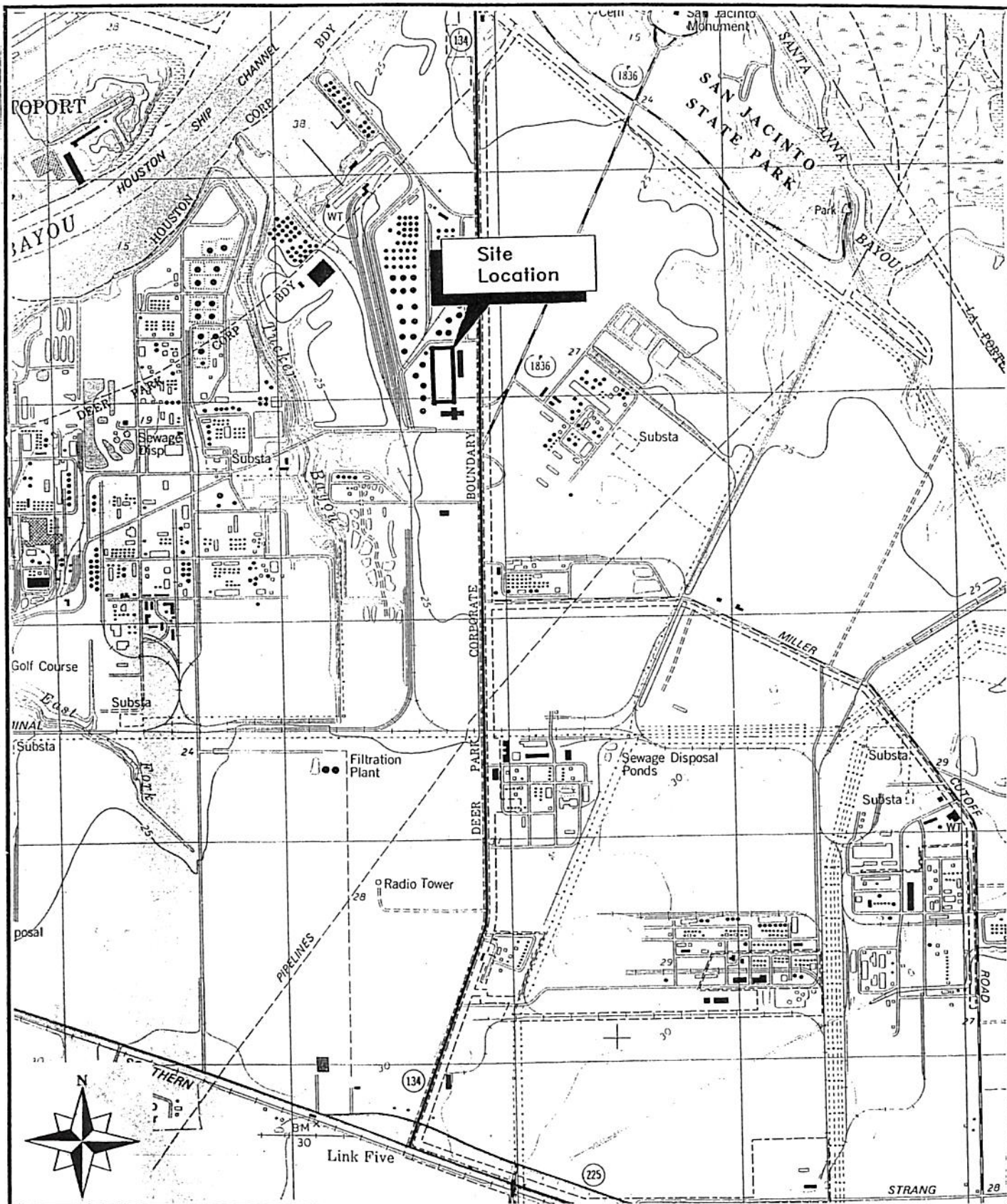
\*\*Concentrations of total metals from background sampling locations SB-1 through SB-5.

\*\*\*Constituent is less than Method Detection Limit (MDL). Background comparison concentration is  
2 x MDL.

BDL - Below Detection Limit

NA - Not Analyzed



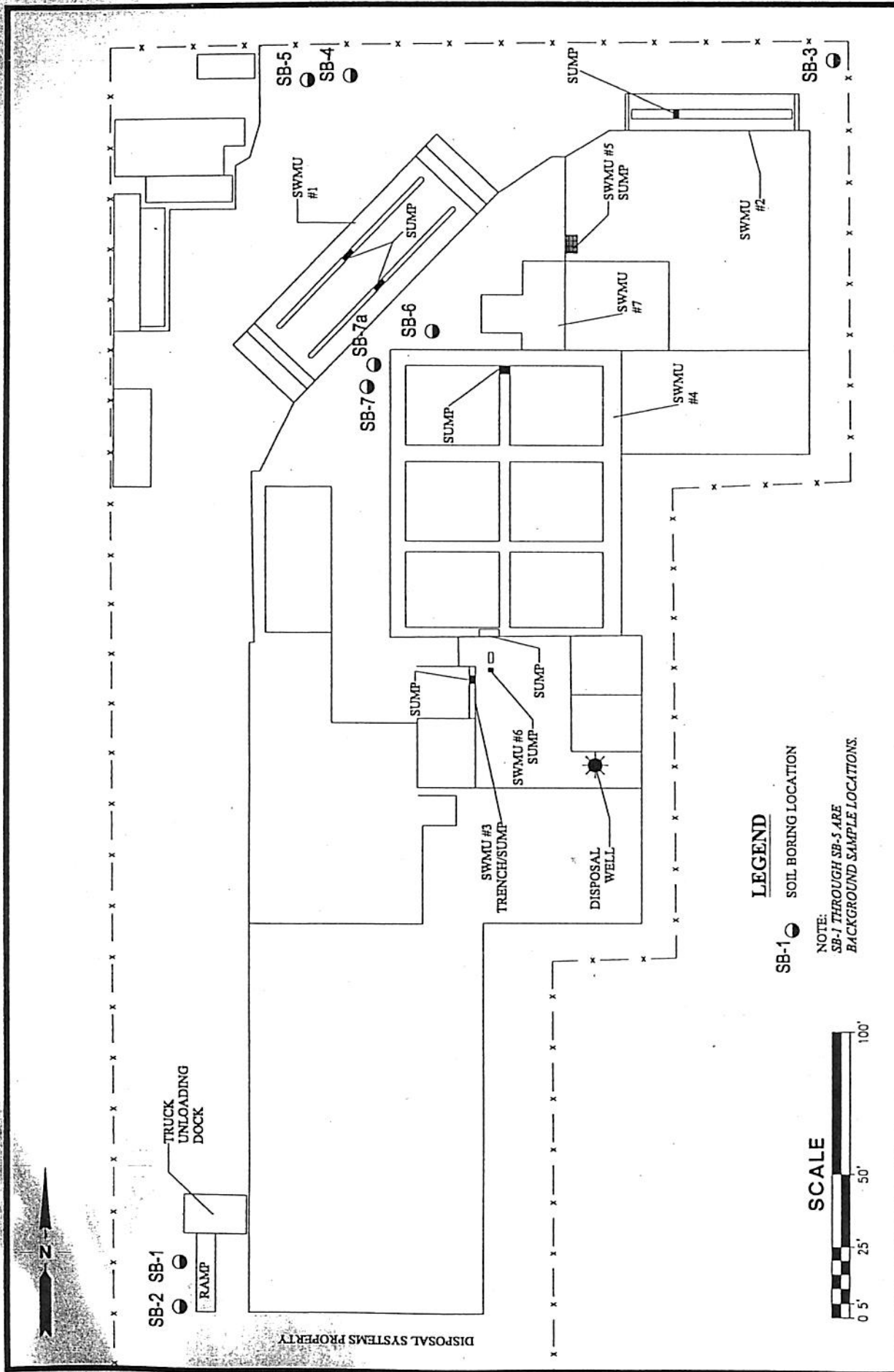


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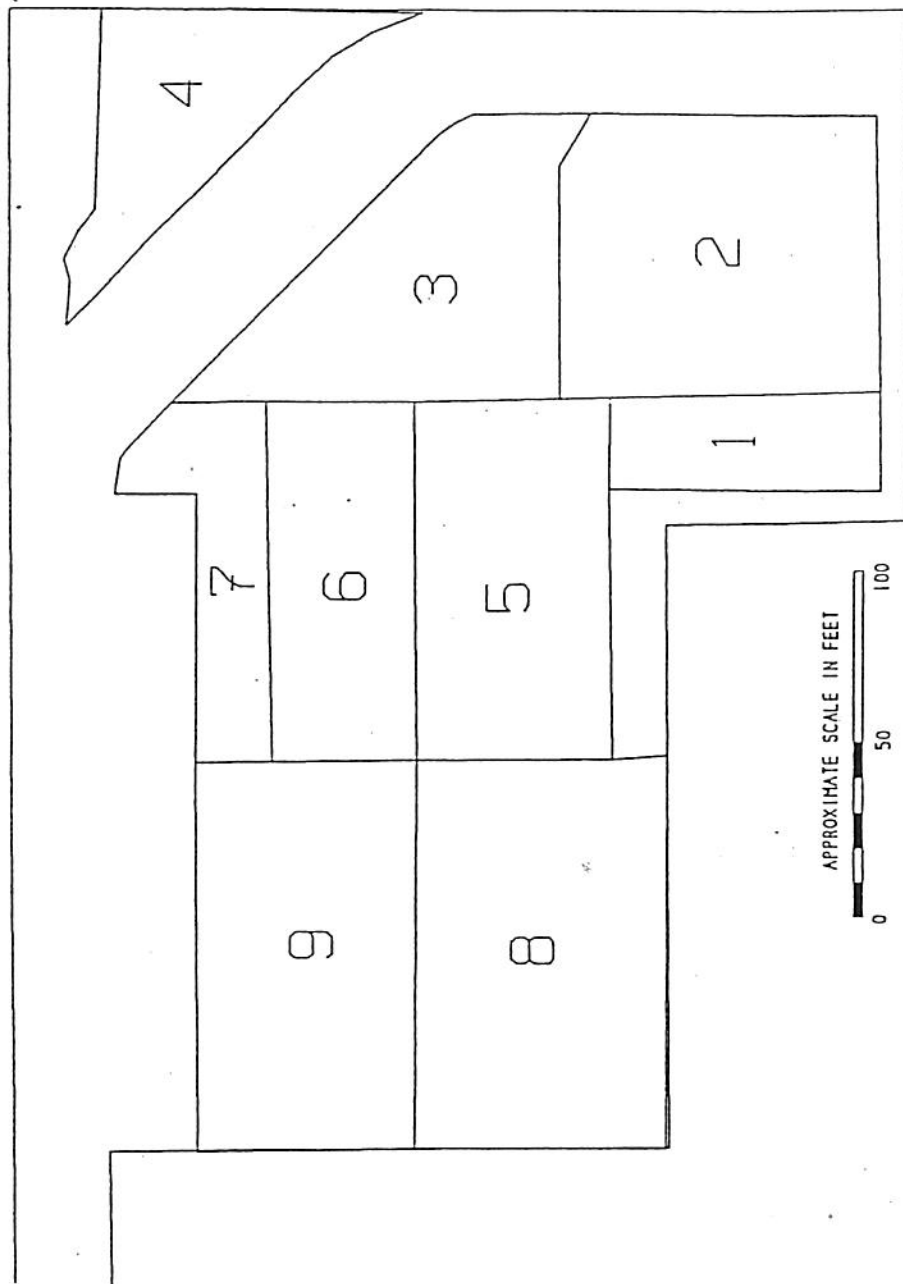
**SITE LOCATION MAP**  
USGS 7.5 MIN. LA PORTE  
TEXAS QUAD., 1982  
DISPOSAL SYSTEMS, INC.  
DEER PARK, TEXAS

Scale: 1" = 2,000 ft.

**FIGURE**  
**1-1**



	<p>PHASE II RFI SOIL BORING LOCATIONS</p> <p>DISPOSAL SYSTEMS, INC.</p> <p>2525 BATTLEGROUND ROAD</p> <p>DEER PARK, TEXAS</p>		9820
	<p>1"=50'</p> <p>CDG</p> <p>4/98</p>		FIG 1-2



APPROXIMATE SCALE IN FEET  
0 50 100

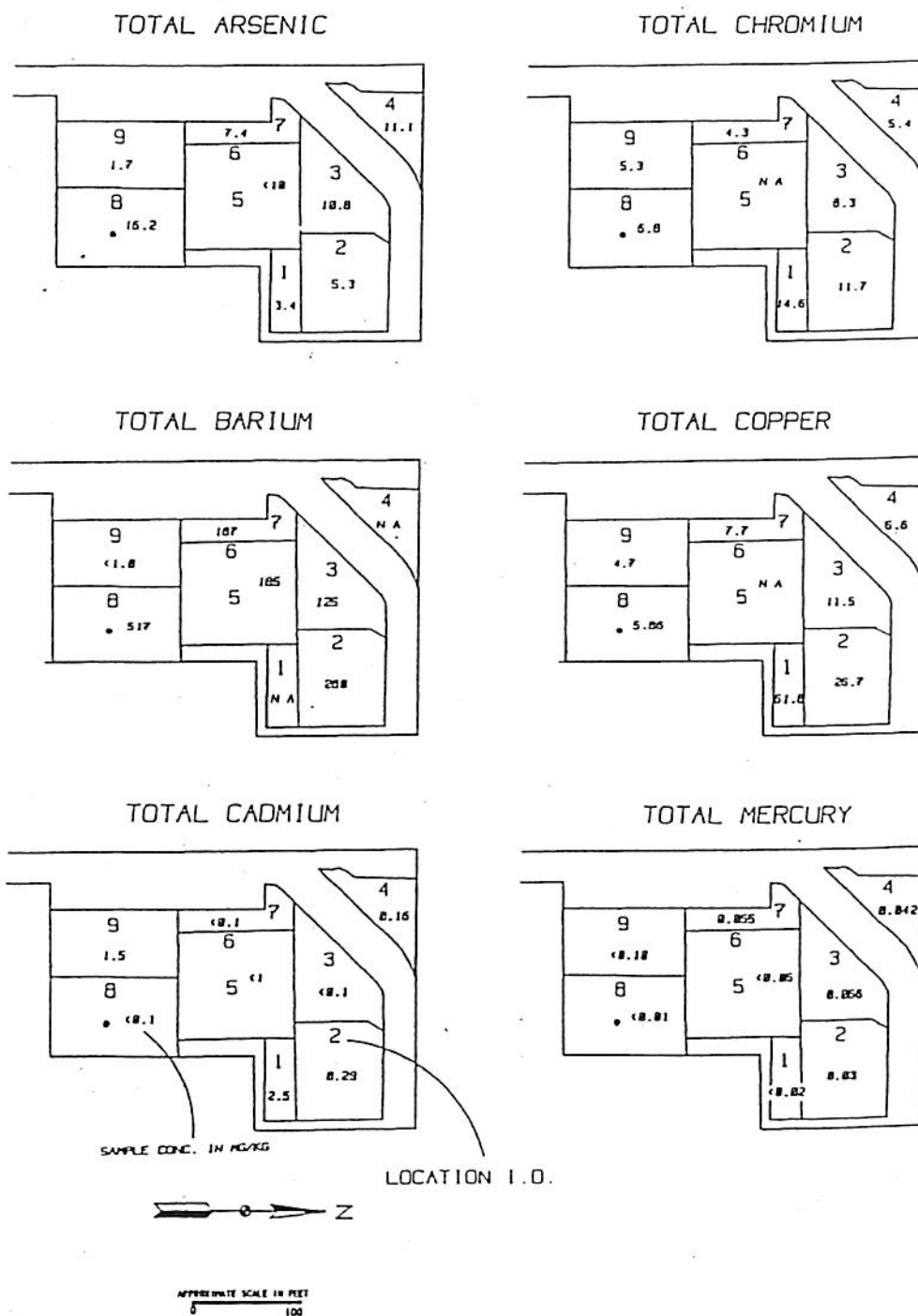
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COMPLIANCE, INC.

Scale:

LOCATIONS EXCAVATED FROM 1984 TO 1986  
RFI Report  
Disposal Systems, Inc.  
Deer Park, Texas

FIGURE  
2-1

Source: The WCM Group, Inc. RFI Work Plan



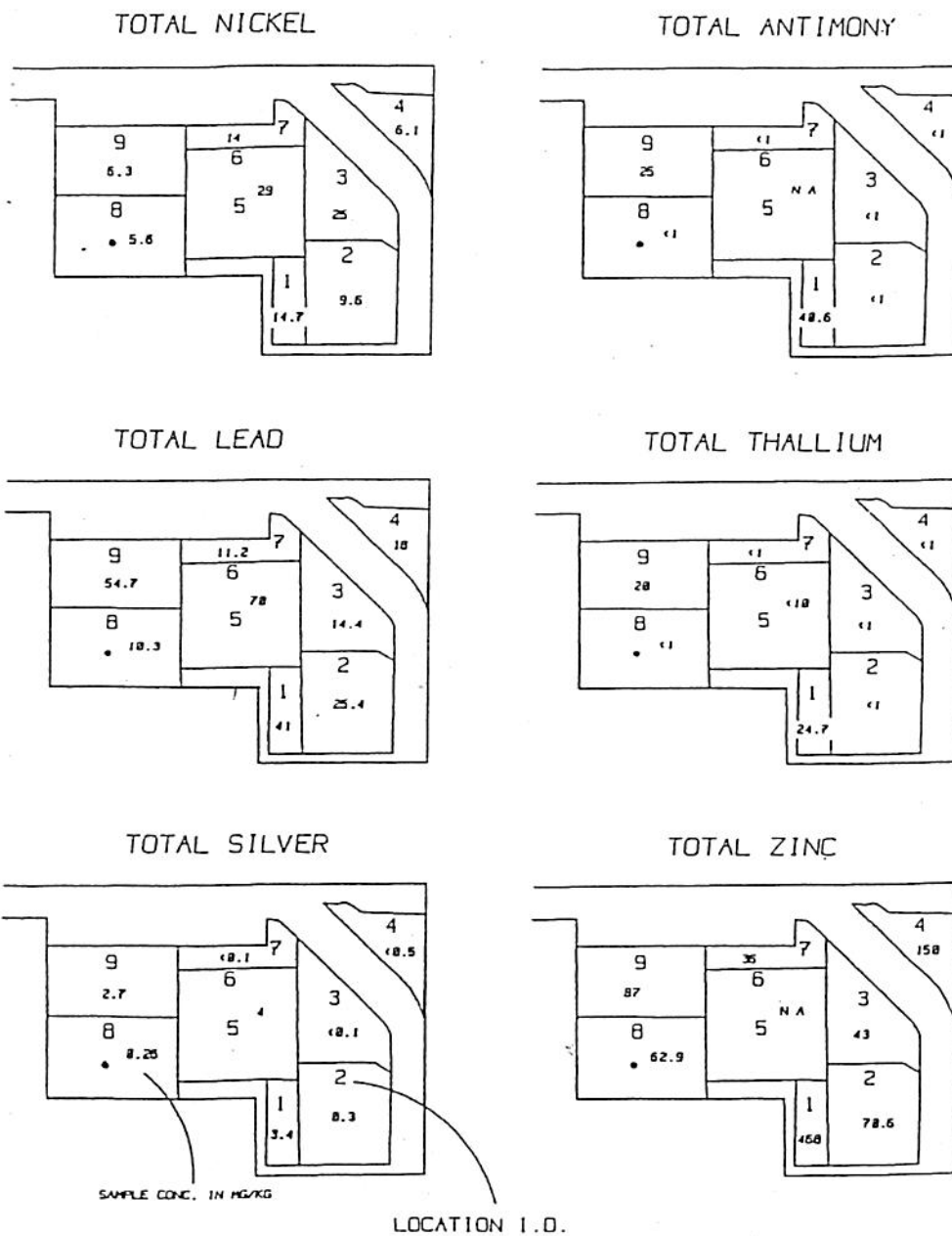
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PERMITTING &  
COMPLIANCE, INC.

TOTAL METALS CONCENTRATIONS REMAINING  
AFTER THE 1984-1986 EXCAVATIONS  
RFI Report  
Disposal Systems, Inc.  
Deer Park, Texas

FIGURE  
2-2

Scale:

Source: The WCM Group, Inc. RFI Work Plan



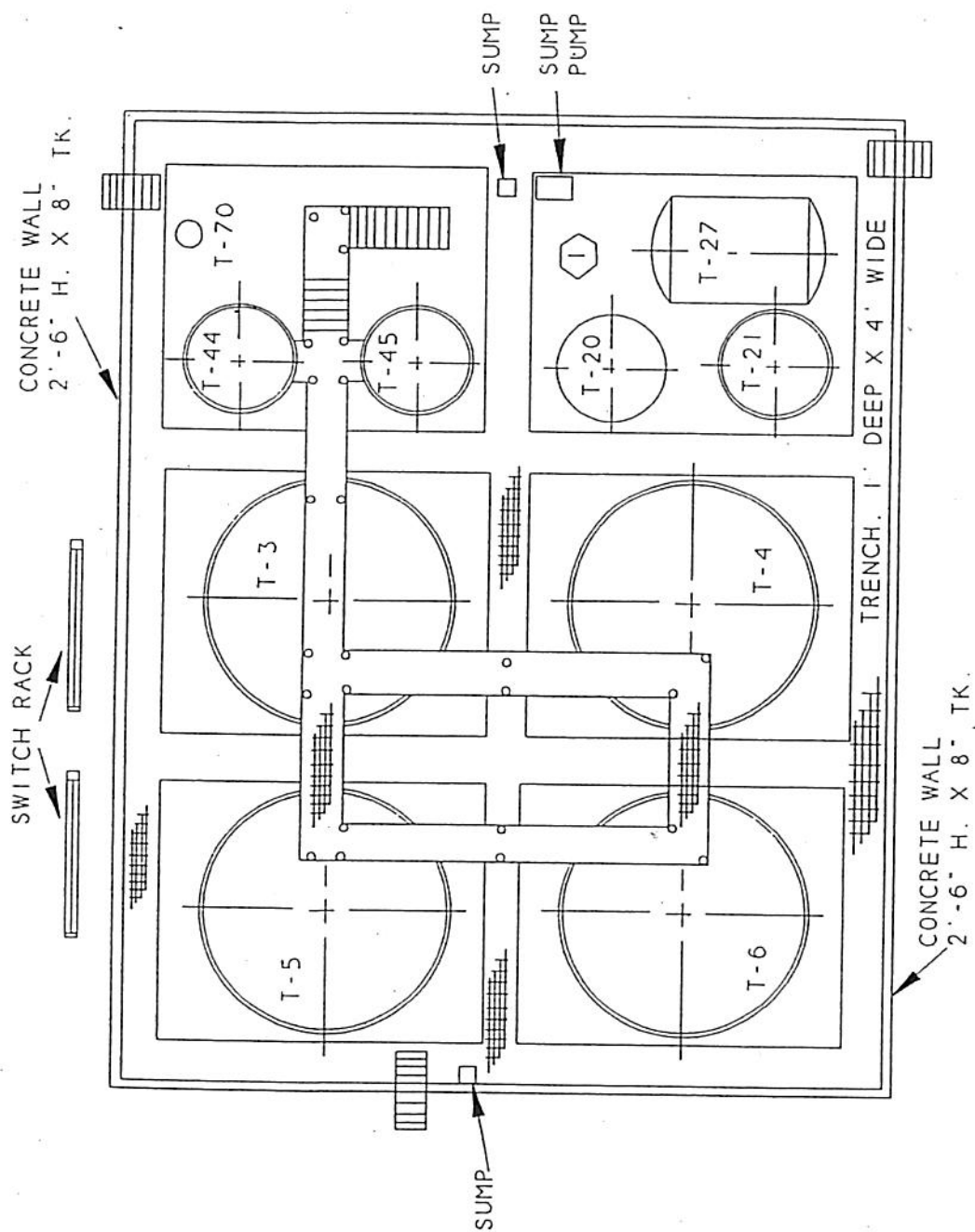
ENVIRONMENTAL  
PERMITTING &  
COMPLIANCE, INC.

Scale:

TOTAL METALS CONCENTRATIONS REMAINING  
AFTER THE 1984-1986 EXCAVATIONS  
RFI Report  
Disposal Systems, Inc.  
Deer Park, Texas

FIGURE  
2-3

Source: The WCM Group, Inc. RFI Work Plan



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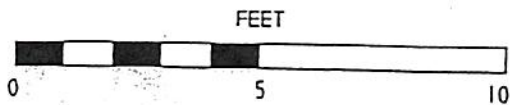
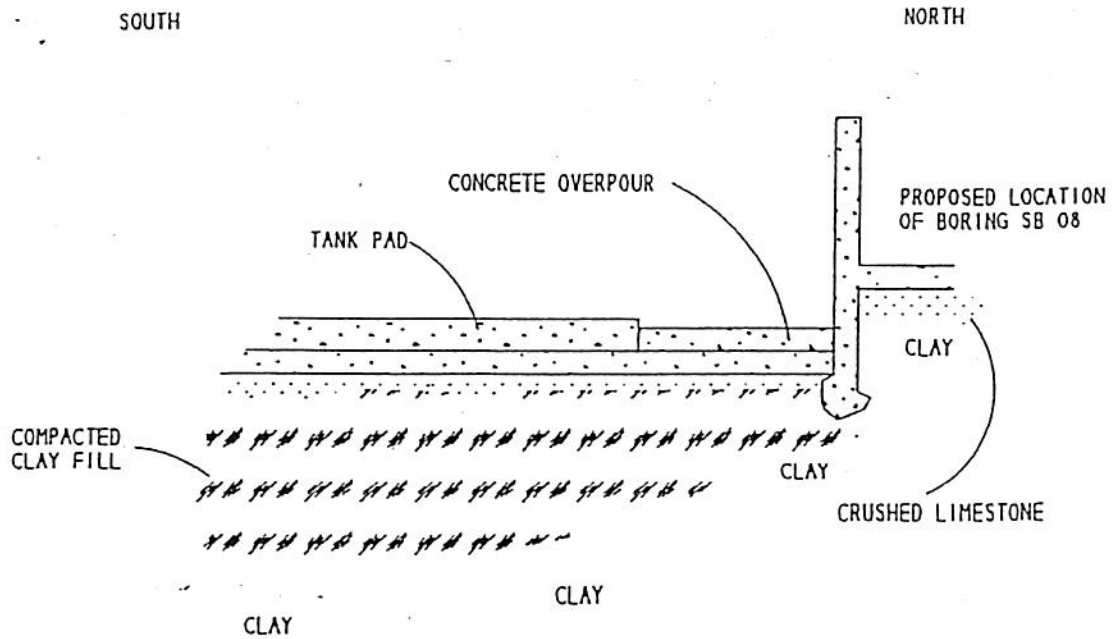
Scale:

SWMU #4  
RFI Report  
Disposal Systems, Inc.  
Deer Park, Texas

FIGURE  
2-4

Source: The WCM Group, Inc. RFI Work Plan

CROSS-SECTIONAL VIEW OF TYPICAL CONSTRUCTION

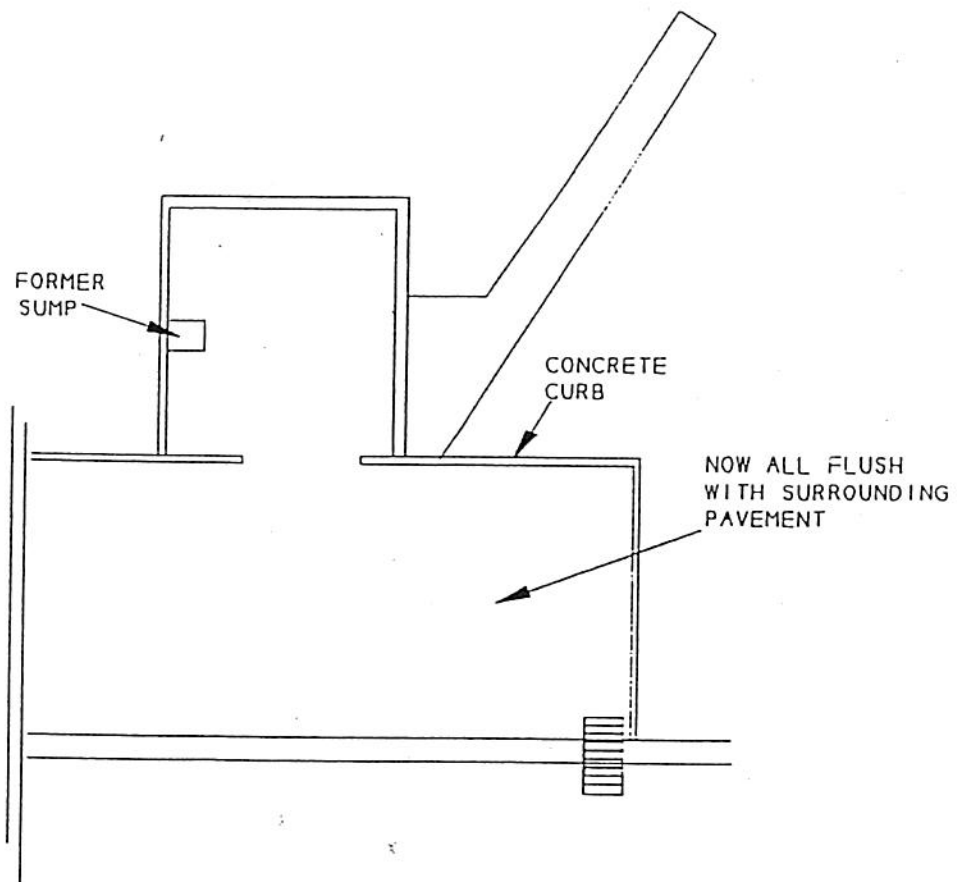


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COMPLIANCE, INC.

**SWMU #4 - CROSS-SECTIONAL VIEW**  
RFI Report  
Disposal Systems, Inc.  
Deer Park, Texas

**FIGURE  
2-5**

Scale:



APPROXIMATE SCALE 1" = 10'



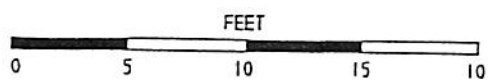
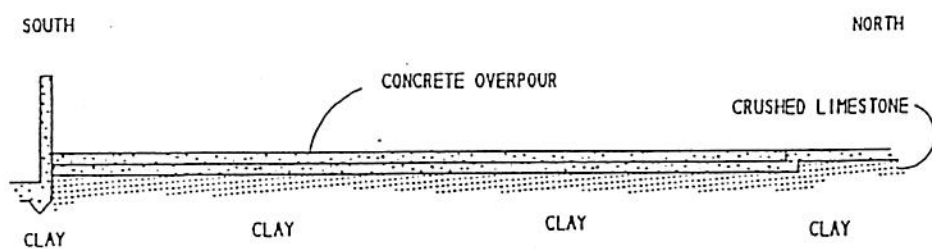
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COMPLIANCE, INC.

SWMU #7  
RFI Report  
Disposal Systems, Inc.  
Deer Park, Texas

FIGURE  
2-6

Scale:

Source: The WCM Group, Inc. RFI Work Plan



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COMPLIANCE, INC.

Scale:

**SWMU #7 - CROSS-SECTIONAL VIEW**  
**RFI Report**  
**Disposal Systems, Inc.**  
**Deer Park, Texas**

**FIGURE**  
**2-7**



**APPENDIX A**  
**TNRCC APPROVAL LETTER**

Barry R. McBee, *Chairman*  
R. B. "Ralph" Marquez, *Commissioner*  
John M. Baker, *Commissioner*  
Dan Pearson, *Executive Director*



received  
Jan 26 1998

## TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

*Protecting Texas by Reducing and Preventing Pollution*

January 20, 1998

Mr. W. R. Reeves  
Vice President Regulatory Affairs  
Disposal Systems, Inc.  
P.O. Box 1914  
Deer Park, TX 77536

Re: Modified (Revised) RCRA Facility Investigation (RFI) Workplan - Approval  
TNRCC Industrial Solid Waste Registration No. 32299  
TNRCC Hazardous Waste Permit No. HW-50058  
EPA ID No. TXD000719518

Dear Mr. Reeves:

The Texas Natural Resource Conservation Commission ("TNRCC") Corrective Action Team has reviewed your letters dated January 5, 1995, and May 16, 1997 and the corresponding submittals of the Revised and Modified RCRA Facility Investigation (RFI) Workplans. The Revised RFI Workplan was submitted in response to the TNRCC letter dated September 29, 1994 and the subsequent meeting of November 9, 1994. The Modified RFI Workplan was submitted in response to the meeting held at the facility on April 15, 1997. The following Solid Waste Management Units (SWMUs) are addressed in the Modified RFI Workplan:

1. Truck Unloading Sump (northwest of Storage/Treatment Unit I);
2. Truck Unloading Sump (north of Storage/Treatment Unit II);
3. Storage/Treatment Unit III Filter Sump;
4. Storage/Treatment Unit I Trench/Sump System;
5. Storage/Treatment Unit II Sump;
6. Filtration Unit I Sump; and
7. Transfer Pump Station and ancillary underground piping.

The TNRCC hereby approves the Modified RFI Workplan as an initial assessment. Our review indicates that the proposed activities, if properly executed, should satisfy the minimum requirements of Provision VIII.B. and C. of your Hazardous Waste Permit. Procedures outlined in the approved Workplan may be used to guide any additional investigations. However, please note that EPA guidance documents (e.g., the Corrective Action Plan) should be used as performance standards for such investigations. The RFI Report will be reviewed in detail as to the technical quality and content.

Mr. W. R. Reeves

Page 2

January 20, 1998

Please proceed with the investigation and submit an original and one copy of the RFI Report, in accordance with the approved schedule, to the TNRCC Corrective Action Team. Also, send one copy to Ms. Marsha Hill, Regional Manager, TNRCC, Region 12 Office, 5425 Polk Avenue, Suite H, Houston TX 77023-1486.

If you have any questions concerning this matter, please contact Mr. David W. Hastings of the Corrective Action Team at (512) 239-2349, Mail Code MC 127.

Sincerely,



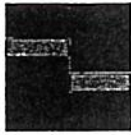
Ray S. Risner, Supervisor  
Corrective Action Team  
Pollution Cleanup Division

RSR/dwh

cc: Ms. Marsha Hill, TNRCC Region 12 Office, Houston  
Ms. Tennie Larson - TNRCC, PC CA Section (CA-150, PH I RFI Workplan)



**APPENDIX B**  
**SOIL BORING LOGS**



ENVIRONMENTAL  
PERMITTING &  
COMPLIANCE, INC.

**BORING LOG**  
**DISPOSAL SYSTEMS, INC.**  
**DEER PARK, TEXAS**

**SB-1**

page 1 of 1

Project No.: 217.01	Screen Length: N/A
Date Drilled: 3/18/98	Slot Size: N/A
Geologist: B. Moore, P.G.	
Driller: Vironex	Casing: N/A
Method: Geoprobe	Top of Casing Elevation: N/A
Completion: None	Ground Elevation: N/A

DEPTH (ft.)	S	A	HNU	LITH- OLOGY	DESCRIPTION	REMARKS
					0-1.0' Brown sandy gravel fill material-moist from recent rain.	6" of concrete on surface.
					1.0-4.0' Stiff dark brown clay (CH)	amount recovered-36".
5					Total Depth = 4.0' Below Bottom of Concrete	
10						
15						
20						
25						



ENVIRONMENTAL  
PERMITTING &  
COMPLIANCE, INC.

**BORING LOG**  
**DISPOSAL SYSTEMS, INC.**  
**DEER PARK, TEXAS**

**SB-2**

page 1 of 1

Project No.: 217.01	Screen Length: N/A
Date Drilled: 3/18/98	Slot Size: N/A
Geologist: B. Moore, P.G.	
Driller: Vironex	Casing: N/A
Method: Geoprobe	Top of Casing Elevation: N/A
Completion: None	Ground Elevation: N/A

DEPTH (ft.)	S	A	HNU	LITH- OLOGY	DESCRIPTION	REMARKS
					0-2.0' Dark brown sandy gravel fill material.	6" of CONCRETE on surface.
					2.0-4.0' Stiff dark brown clay (CH)	amount recovered-41".
5					Total Depth = 4.0' Below Bottom of Concrete	
10						
15						
20						
25						

Project No.: 217.01  
Date Drilled: 3/18/98  
Geologist: B. Moore, P.G.  
Driller: Vironex  
Method: Geoprobe  
Completion: None

Screen Length:	N/A
Slot Size:	N/A
Casing:	N/A
Top of Casing Elevation:	N/A
Ground Elevation:	N/A

[illegible]

Project No.: 217.01	Screen Length: N/A
Date Drilled: 3/18/98	Slot Size: N/A
Geologist: B. Moore, P.G.	
Driller: Vironex	Casing: N/A
Method: Geoprobe	Top of Casing Elevation: N/A
Completion: None	Ground Elevation: N/A

[illegible]



Project No.: 217.01	Screen Length: N/A
Date Drilled: 3/18/98	Slot Size: N/A
Geologist: B. Moore, P.G.	
Driller: Vironex	Casing: N/A
Method: Geoprobe	Top of Casing Elevation: N/A
Completion: None	Ground Elevation: N/A

DEPTH (ft.)	S	A	HNU	LITH- OLOGY	DESCRIPTION	REMARKS
					0-1.0' 3" sandy fill. Brown silty clay with gravel fill material with red mottling.	12" of concrete on surface. amount recovered-48".
					1.0-1.5' Dark brown to reddish brown clayey silt fill material - friable.	
					1.5-2.0' Black silty clay (CL) with small gravel fill material.	
					2.0-4.0' Stiff dark brown silty clay (CL-CH). silt decreases with depth and becomes stiffer clay.	
					Total Depth = 4.0' Below Bottom of Concrete	
5						
10						
15						
20						
25						

Project No.: 217.01	Screen Length: N/A
Date Drilled: 3/18/98	Slot Size: N/A
Geologist: B. Moore, P.G.	
Driller: Vironex	Casing: N/A
Method: Geoprobe	Top of Casing Elevation: N/A
Completion: None	Ground Elevation: N/A

DEPTH (ft.)	S	A	HNU	LITH- OLOGY	DESCRIPTION	REMARKS
					0-1.0' Reddish brown clayey silty gravel fill material (moist from recent rain) 0-9"	12" of concrete on surface.
					1.0-4.0' Silty Clay (CL), red to 1.5'. Medium gray with red streaks from 1.5-4.0'. 1" silt stringer at 2.5'.	amount recovered-48".
5					Total Depth = 4.0' Below Bottom of Concrete	
10						
15						
20						
25						



**BORING LOG  
DISPOSAL SYSTEMS, INC.  
DEER PARK, TEXAS**

**SB-7**

page 1 of 1

[illegible]



**BORING LOG  
DISPOSAL SYSTEMS, INC.  
DEER PARK, TEXAS**

**SB-7A**

page 1 of 1

Project No.: 217.01  
Date Drilled: 3/18/98  
Geologist: B. Moore, P.G.  
Driller: Vironex  
Method: Geoprobe  
Completion: None

Screen Length:	N/A
Slot Size:	N/A
Casing:	N/A
Top of Casing Elevation:	N/A
Ground Elevation:	N/A

DEPTH (ft.)	S	A	HNU	LITH- OLOGY	DESCRIPTION	REMARKS
					0-1.0' Dark brown silty clay and tan gravel fill material	12" of concrete on surface.
					1.0-4.0' Dark brown silty clay;(CL)	amount recovered-48".
5					Total Depth = 4.0' Below Bottom of Concrete	
10						
15						
20						
25						

